REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

The drawings are objected to because Figures 6 and 7 should be designated by a legend such as --Prior Art--. The drawings have been amended to label Figures 6 and 7 as prior art.

The abstract of the disclosure is objected to because it exceeds the maximum length of 150 words. The abstract of the disclosure has been amended to be less than 150 words.

The specification has been amended to reflect that figure 2 is a top view.

After amending the claims as set forth above, claims 2-13 are now pending in this application.

Applicant expresses appreciation to the Examiner for the indication that claims 3-4 and 7-8 would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims. Claims 3 and 4 have been rewritten in independent form. The only additional changes made to claims 3 and 4 is that "clamp member" has been changed to "clamping element". Thus, claims 3 and 4, as amended, are believed to be allowable. Because it depends from claim 3, claim 7 is also believed to be allowable. Because it depends from claim 4, claim 8 is also believed to be allowable.

Claims 1, 5, 9, and 10 are rejected under 35 U.S.C. 102(b) as being anticipated by Monguzzi et al (U.S. Patent 5,095,517) (hereinafter Monguzzi). Claims 2 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Monguzzi and further in view of Applicant's admitted prior art.

Claim 1 has been cancelled. With respect to claims 2, 5-6, and 9-10, as amended, the rejections are respectfully traversed.

New independent claim 11 has been added to recite a face alignment device comprising:

"a first convex semi-spherical block having a first contact surface and a first convex semi-spherical surface on the opposite side of the first contact surface;

a second convex semi-spherical block having a second contact surface and a second convex semi-spherical surface on the opposite side of the second contact surface;

a first base block having a first concave portion corresponding to the first convex semi-spherical surface of the first convex semi-spherical block for rotatably holding the first convex semi-spherical block;

a second base block having a second concave portion corresponding to the second convex semi-spherical surface of the second convex semi-spherical block for rotatably holding the second convex semi-spherical block;

a clamping element making contact with the first contact surface and the second contact surface at an eccentric position from the center axes of the first and second convex semi-spherical blocks for securing an object; and

an air layer forming means for forming an air layer between the first convex semi-spherical surface of the first convex semi-spherical block and the first concave portion of the first base block and between the second convex semi-spherical surface of the second convex semi-spherical block and the second concave portion of the second base block;

wherein the first convex semi-spherical block and the second convex semi-spherical block are arranged such that the first contact surface faces the second contact surface." (Underlines added for emphasis)

The face alignment device including the above-quoted features has at least two main advantages over the prior art. One advantage is that the clamping element makes contact with contact surfaces at an eccentric position from the center axes of the convex semi-spherical blocks. Accordingly, the load for allowing rotational sliding between each of the semi-spherical surfaces of the convex semi-spherical blocks and each of the concave portions of the base blocks can be small. For example, the load can be as small as several tens of grams rather than the conventional amount of several hundreds of grams to several kilograms. A smaller load helps to prevent breakage and damage of the objects. A second advantage is that an air layer is formed between each of the convex semi-spherical blocks and each of the concave portions of the base blocks. The air layer allows for face alignment that can be realized with high accuracy in a short period of time while also maintaining a simple structure for the face alignment device. Advantages such as those described above are discussed in the specification (e.g. page 6, lines 21-24; page 7, line 24 to page 8, line 1; page 9, lines 18-26).

Monguzzi neither discloses nor suggests the face alignment device including the above-quoted features with a clamping element making contact with a first and a second convex semi-spherical block at an eccentric position from the center axes of the convex semi-spherical blocks. The Examiner points to Figure 5 of Monguzzi as showing a clamp member arranged at eccentric positions from the center axes of semi-spherical blocks. However, in Figure 5 of Monguzzi, a fiber holding body (reference number 7b) is slidably received within a hole (18) of a bushing (19) which threadingly engages a tubular body (19a) integral with a spherical element (9) (see Monguzzi Figure 5; column 6, lines 38-42). While the fiber holding body (7b) can be axially shifted relative to the spherical element (9), it still must be received within the bushing (19) that engages the tubular body (19a) that is not shown to be axially shifted relative to the spherical element (see Monguzzi column 6, lines 27-44). In Figure 5 of Monguzzi, the tubular body (19a) is shown to be provided at the rotation center (C) of the spherical element (9b) (see Monguzzi Figure 5, column 6, lines 10-13). The clamping element in Monguzzi comprises both the fiber holding body and the tubular body. Thus, the clamping element in Monguzzi makes contact with the spherical element at the rotation center of the spherical element.

Moreover, it would not have been obvious to combine the air supply means of Applicant's admitted prior art with the device in Monguzzi since the device in Monguzzi is not used to align the faces of objects with each other, but to adjust the angle at which a light beam is entered into an optical component. The device in Monguzzi requires a locking nut to provide resistance and, as stated in Monguzzi, "more or less tightening of the locking nut 12 enables the most appropriate resistance to rotation of the body 7 to be generated by friction, and the required accuracy in the body inclination can be obtained by manually manipulat[ing] the fiber holding body 7." (see Monguzzi column 5, lines 45-60). In contrast, the air layer formed in the admitted prior art does not provide for differing levels of resistance as does the locking nut, but allows for a spherical surface to freely slide without resistance on a support member (see Specification page 3, lines 3-11). Such elimination of sliding resistance would not be beneficial to the device in Monguzzi where an appropriate level of resistance is desired for orientation of the fiber holding body.

Therefore, independent claim 11 is neither disclosed nor suggested by the cited prior art and, hence, is believed to be allowable.

Dependent claim 2, as amended, recites a face alignment device according to claim 11 further comprising:

"a moving means for moving the first base block and the second base block to be close to or apart from each other."

The face alignment device including the above-quoted feature solves the problem in the prior art that when air is evacuated from between a convex spherical surface and a concave surface of a support member after aligning two objects, a gap is formed between the two objects that had been aligned. The gap causes a load on the upper surface of one of the objects to change and requires a mechanism for following the change in the load. In addition, the gap also causes a change in the optical transfer characteristic. With the face alignment device of the present claim, the air layers may be eliminated while the two base blocks are translated toward each other by the moving means. Thus, the objects can be bonded accurately without moving when the air is evacuated. Problems with the prior art and advantages of the present claim such as those described above are discussed in the specification (e.g. page 6, lines 7-16; page 8, lines 1-9).

The Examiner points to Applicant's admitted prior art on pages 2-3 of the current application as disclosing a moving means for moving two base blocks to be close to or apart from each other (see Figure 7, reference numbers 104-106). However, in the prior art, an air layer (105) is for moving a seat (106) away from a base block (101) and not for moving two base blocks to be close to or apart from each other. Furthermore, there is only a single base block (101) in the prior art and, thus, there is no way for two base blocks to move close to or apart from each other. Also, the prior art has the problem that when air is evacuated from the device, a gap is formed between two objects that have been aligned, which causes a change in an optical transfer characteristic (see Specification page 5, line 26 to page 6, line 16). The alignment device of the present claim solves such a problem.

Therefore, dependent claim 2, as amended, is neither disclosed nor suggested by the cited prior art and, hence, is believed to be allowable.

Dependent claim 5, as amended, recites a face alignment device according to claim 11,

"wherein the object is held outside an area between the first convex semi-spherical block and the second convex semi-spherical block by the clamping element,

wherein a face that is to be aligned of the object extends out of the clamping element, and

wherein a weight is provided at the other end of the clamping element opposite to the object." (Underlines added for emphasis)

The face alignment device including the above-quoted features allows for a clamping element to hold an object outside of two semi-spherical blocks where a face that is to be aligned of the object extends out of the clamping element. As a result, the face of the object is uncovered, which allows efficient operations such as adhesion application and laser irradiation. In addition, since a weight is provided at an opposite end of the clamping element from the object, face alignment can be performed in a stable manner. Advantages such as those described above are discussed in the specification (e.g. page 8, line 23 to page 9, line 4).

Monguzzi neither discloses nor suggests the alignment device including the above-quoted features with a face that is to be aligned of an object extending out of a clamping element. In Monguzzi, a face of a fiber is completely shielded inside of a fiber holding body (see Monguzzi Figure 5, reference numbers 4, 7b, 19a). Thus, the face of the object in Monguzzi is covered, which would not allow for efficient operations such as laser irradiation.

Therefore, dependent claim 5, as amended, is neither disclosed nor suggested by the cited prior art and, hence, is believed to be allowable.

Independent claim 9 recites a face alignment method where a clamping element makes contact with contact surfaces of two units at an eccentric position from the center axes of convex semi-spherical blocks of the two units. Therefore, claim 9 is believed to be allowable for at least the same reasons discussed above with respect to the clamping element making contact with contact surfaces at an eccentric position in claim 11.

Independent claim 10, as amended, recites a face alignment method, comprising:

"arranging two units, which are each provided with a convex semi-spherical block having a contact surface that makes contact with a first clamping element for securing a first object and a convex semi-spherical surface on the opposite side of the contact surface, and a

base block having a concave portion corresponding to the semi-spherical surface of the convex semi-spherical block for rotatably holding the convex semi-spherical block, such that the contact surfaces of the two units face each other; and

securing a second object with a second clamping element that does not make contact with the contact surfaces of the convex semi-spherical blocks of the two units,

wherein the faces of the objects are aligned while the first clamping element makes contact with the contact surfaces of the units such that the center point of the face of the first object corresponds to a center point of an imaginary sphere formed by the facing semi-spherical surfaces of the convex semi-spherical blocks." (Underlines added for emphasis)

The face alignment method including the above-quotes steps allows for the faces of objects to be aligned while the center point of the face of one object is matched with the center point of an imaginary sphere formed by the facing semi-spherical surfaces. Such an improvement allows for face alignment to be performed easily without the center axes of the objects being offset from each other. Advantages such as those described above are discussed in the specification (e.g. page 10, lines 19-23).

Monguzzi neither discloses nor suggests the face alignment method including the above quoted steps with the faces of two objects being aligned while the center point of the face of one of the objects corresponds to a center point of an imaginary sphere formed by two facing semi-spherical surfaces. Indeed, Monguzzi is not even concerned with the problem of aligning the faces of two objects. In Monguzzi, a single object is positioned so that the light beam output from the object is oriented so as to achieve a maximum light intensity for the light beam (see Monguzzi column 4, lines 33-46).

Furthermore, Applicant's admitted prior art (Japanese Patent Laid-Open Application No. 8-281464) neither discloses nor suggests the face alignment method of the present claim. As discussed in the specification, one of the problems in the prior art is that objects are not placed at a position corresponding to the center of a spherical surface, which may result in the offset of the center axes of the objects from each other (see Specification page 5, lines 6-9). When the center axes of the objects are offset from each other, the center axes need to be readjusted after face tracing (see Specification page 5, lines 13-17).

Therefore, independent claim 10, as amended, is neither disclosed nor suggested by the cited prior art and, hence, is believed to be allowable.

All dependent claims are believed to be allowable for at least the same reasons as the independent claims from which they depend.

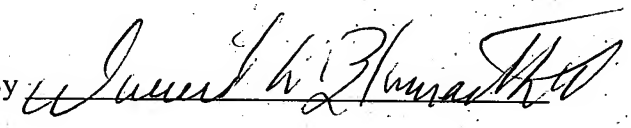
The Examiner is requested to acknowledge receipt of the IDS filed on 2/26/02.

The application is now considered to be in condition for allowance and an early indication of same is earnestly solicited.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date October 7, 2003

By 

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